

## CLAIMS

1. Method for the antenna selection in the fixed radio station (RFP) of a digital telecommunication system of the TDMA type, in which the signals are arranged in frames with a preset duration, and in each frame a predetermined number of time slots are assigned,  
said system including a plurality of radiomobile units (PP), and said fixed radio station (RFP), which at its turn includes correlation means, i.e. means adapted to perform the correlation operation at the moment of receiving of each time slot of the frame of said digital signal and means adapted to select one antenna, or a plurality of antennas, connected to them, and in particular:

- N antennas, with  $N \geq 1$ , for the management in space diversity and/or polarisation of the received signal, and/or
- an array of sectorial antennas, and/or
- an array of phased antennas,

characterised in that it comprises the following operational steps:

- a) verifying if the correlation operation carried out by said correlation means has been successful or not;
- b) in the case of failed correlation, sequential scanning within the same time slot of all available antennas and repeatedly measuring the received field strength or RSSI for a predetermined number K of measuring cycles;
- c) compiling a table containing for each antenna K measured RSSI values;
- d) verifying if the power variability of each antenna during the period of a time slot is included in a first preset range;
- e) in the affirmative case, verifying if the power variability between the different antennas stays in a second preset range comparing the data contained in the above-mentioned table;
- f) if the verification according to the previous step e) has a negative result, starting the selection of the antenna/s applying a criterion which takes into consideration the result of the comparison according to the previous step e).

2. Method according to claim 1, characterised in that said fixed radio station (RFP) includes at least a pair of space diversity antennas and in that the criterion according to step f) consists in the choice of the antenna which received field strength value turns out to be the highest one among all measured ones.

3. Method according to claim 1, characterised in that said fixed radio station (RFP) includes at least an array of sectorial antennas, and in that the criterion according to step f) consists in the choice of the antenna, which received field strength value turns out to be the highest one among all measured ones.

5 4. Method according to claim 1, characterised in that, if said verification phase according to step d) does not have an affirmative result, it comprises a further step to verify if such value overcomes a first preset threshold, and if not the cycle of operations will be repeated starting from the above-mentioned step b).

10 5. Method according to claim 4, characterised in that, if the radiomobile unit is of the dual mode type and if said further checking step to verify if said value is higher than said first preset threshold has a positive result, also the operational modality change request of the radiomobile unit will be started off (mode handover).

15 6. Method according to claim 1, characterised by fact that, if said verification phase according to step e) points out an overcoming of said second preset range, a further step is foreseen to verify if the power difference among the different antennas overcomes a second preset threshold, and in the negative case, the cycle of operations will be repeated starting from the above-mentioned step b).

20 7. Method according to claim 6, characterised in that, if said further step to verify if the difference of power among the different antennas overcomes a second preset threshold has a positive result, then also the request to change the bearer in use will be started off (bearer handover).

8. Method according to claim 1, characterised in that said number K of measuring cycles is calculated according to the following formula:

$$K = (420 * 868000 - X - Y) / (N * T_a + (N-1) * T_c)$$

25 where:

- "420" is the number of bits in a time slot;
- "868000" is the bit time duration [ $\mu$ S];
- "N" is the number of antennas;
- "Ta" is the measurement time [ $\mu$ S] on the single antenna;
- 30 - "Tc" is the switching time [ $\mu$ S] among the antennas;
- "X" is the inferior limit [ $\mu$ S] of the correlation time window;
- "Y" is the superior limit [ $\mu$ S] of the correlation time window.

02 9. Method according to the previous claims, characterised in that said first and second preset ranges are equal to  $\pm 3$  dBm.

10. Device for the antenna selection in the fixed radio station (RFP) of a digital telecommunication system of the TDMA type, in which the signals are arranged in frames with a predetermined duration, and in each frame a predetermined number of time slots will be assigned, said system including a plurality of radiomobile units (PP) and said fixed station (RFP) which at its turn includes means adapted to carry out the correlation operation at the moment of receiving each time slot of the frame of said digital signal and means for the selection of one antenna or of a plurality of antennas to which are connected:

- N antennas for the management in space diversity and/or polarisation of the received signal, and/or
- an array of sectorial antennas, and/or
- a phased array of antennas,

characterised in that it operates according to the method disclosed in claim 1.